National Park Service photograph by Jennifer Adleman

Balancing the Benefits and Impacts of Science in Alaska's Wilderness

By Peter Landres

The large parks and preserves in Alaska, the wildest places that keep our nation's legacy of wilderness character for future generations, are not immune from onslaughts such as trans-oceanic air pollutants, non-native species, and global climate change. No manager today doubts or questions the need for reliable and accurate information as a basis for preserving the natural heritage and character of Alaska's wilderness. Science is the principal means for deriving such information and has indisputably improved both park and wilderness stewardship *(e.g., Peterson 1996, Graber 2002)*. However, do some types of scientific activities compromise wilderness? Could science threaten wilderness, making it something less and not quite wilderness? Is it possible to have too much science in wilderness? Proposed use of drilling, use of helicopters, and installation of structures for volcanic research in the Katmai Wilderness, for example, caused significant conflict over the benefits and impacts of this research in wilderness *(Eichelberger and Sattler 1994)*.

The signing of the Wilderness Act in 1964 created a National Wilderness Preservation System, and defined wilderness as *…an area where the earth and its community of life are untrammeled by man, where man himself is a visitor who does not remain… (Public Law 88-577)*. ANILCA makes unique provisions for access in Alaska, even in designated wilderness, because of the dependence on subsistence resources by local rural residents. For example, access by motorboat, airplane, and snow machine is allowed for traditional activities. But unless ANILCA expressly states otherwise (Sections 707 and 1315), Alaska wilderness is still managed under the provisions of the Wilderness Act, including the Section 4(b) mandate for "preserving the wilderness character of the area."

In this short article I build on the work of others *(Franklin 1987, Graber 1988, Parsons and Graber 1991, Parsons 2000, Landres et al. 2003)* to explore some of the tensions between the benefits and impacts from science in wilderness created or managed under ANILCA. Because Alaska wilderness is the best of what remains of the wilderness ideal, there is more at risk from the impacts of science as well as more to gain from the benefits of science. Therefore it is vitally important to think carefully about the potential risks and

benefits of science to wilderness character in Alaska.

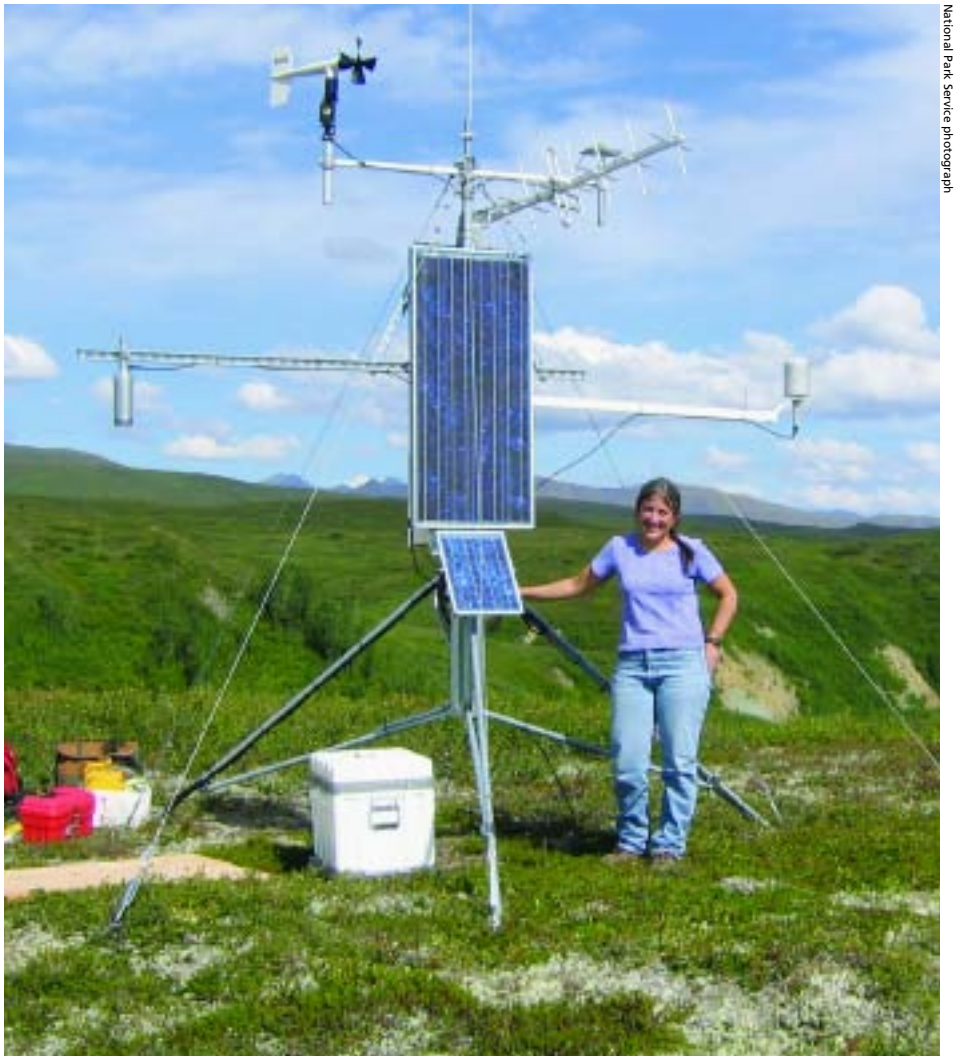
But what is wilderness character? Wilderness character is the combination of biophysical, experiential, and symbolic ideals that distinguish wilderness from other lands *(Landres et al. 2005)*. All three ideals are equally important, forming a complex and subtle set of relationships between the land, its management, and the meanings people associate with wilderness.

Symbolic ideals are generally the least recognized and understood *(Scott 2002)*, yet arguably the most important for understanding the impacts of science to Alaska wilderness. Symbolic ideals in wilderness address the need for some areas where mechanization and developments are not allowed, where managers intentionally restrain themselves, where people are not in control. Such places are what Leopold (1949) described as "a blank spot on the map." This notion of wilderness as a "blank spot" implies that we intentionally do not need to know everything we can about an area. As a society, the dilemma we face is balancing the need to understand how natural ecological systems function that are relatively unaffected by modern people, while still protecting the notion of a "blank spot." The stakes of this dilemma are high because Alaska wilderness potentially represents our nation's largest and best "blank spots."

Evaluating how much is too much impact from science in wilderness areas depends on many things, including legislation, management policy, agency culture, and public and personal values. All scientific activities impact wilderness, but some (such as a simple inventory) have little impact, while others (such as the use of motorized equipment or installation of monitoring devices) have large impacts. The essential question about science in wilderness focuses on whether the benefits outweigh the impacts. Wilderness managers, following legislation and policy, typically identify benefits in terms of preserving wilderness character. There are other benefits, however, that in my view also need to be considered. These are the benefits to society from scientific research that recognizes wilderness as the best and sometimes only place to understand natural ecological systems and human relationships to these systems.

In weighing benefits and impacts from scientific activities, an analysis that considers all three ideals of wilderness character will be more complete than one focused on only one or two aspects. For example, if just biophysical impacts are considered, then uses of mechanized tools and transportation could be justified to reduce impacts to soil and vegetation. Such justification ignores impacts to the experiential and symbolic aspects of wilderness character. In Alaska the use of motorboats, airplanes, and snow machines is allowed and may fit the "minimum requirement" (see *Anderson 1999* for explanation and application of this concept to science activities in wilderness), but these uses nonetheless compromise the wilderness character of the area as defined by the 1964 Wilderness Act *(Hendee and Dawson 2002, Landres et al. 2005)*.

While many types of scientific activities are appropriate in wilderness, some are



National Park Service photograph

Achieving consistency in permitting decisions across multiple units of the National Park System remains a constant challenge. When opportunities allow, park managers combine environmental compliance for related projects spanning several units, such as the installation of climate monitoring stations for the Inventory & Monitoring networks.

Opposite Page: Novarupta Volcano, which erupted in 1912, was the largest (by volume) eruption in the 20th century. During the 1990s, the NPS received a proposal for a large multi-year research drilling project at Novarupta. The proposed activities raised serious questions about the appropriate level of scientific research in wilderness. The proposal was withdrawn following the NPS selection of "no-action" as the preferred management alternative.

simply not or would at least require careful scrutiny to determine if the benefits outweigh the impacts. For example, extensive use of motorized equipment or mechanical transport and long-term or permanent installations would need careful scrutiny. Likewise, scientific activities that set a national precedent for impacts, or cause significant, lasting, or cumulative degradation of any aspect of wilderness character raise very serious issues.

Alaska wilderness is too important to assume that all scientific activities are benign and therefore approved, or that they are harmful and therefore denied. A comprehensive evaluation framework that considers legislation, policy, and the benefits and impacts of the proposed work is needed most. This framework would stimulate dialogue between managers and scientists when the scientific activity is first being considered. Such dialogue offers the best chance for balancing scientific research on ecological systems and human relationships to these systems with preserving the wilderness character of Alaska wilderness.

U.S. Geological Survey photograph

Despite the obvious challenges and costs involved, remote instrument stations are often the most effective and least intrusive way to collect needed data. The Alaska Volcano Observatory has established a network of seismic stations, like this one in Aniakchak Caldera, to monitor volcanic activity.

REFERENCES

Anderson, R.L. 1999.
Research administration in wilderness: defining the "minimum requirement" exception. In *On the Frontiers of Conservation: Proceedings of the 10th Conference on Research and Resource Management in Parks and on Public Lands,* edited by D. Harmon. The George Wright Society. Hancock, Michigan. pp. 415-417.

Eichelberger, J., and A. Sattler. 1994.
Conflict of values necessitates public lands research policy. Transactions of the American Geophysical Union 75:505-508.

Franklin, J.F. 1987.
Scientific use of wilderness. In *Proceedings of the National Wilderness Research Conference: Issues, State-of-Knowledge, Future Directions,* compiled by R.C. Lucas. U.S.D.A. Forest Service General Technical Report INT-220. Intermountain Research Station. Ogden, UT. pp 42-46.

Graber, D.M. 1988.
The role of research in wilderness. George Wright Forum 5(4):55-59.

Graber, D.M. 2002.
Scientific values of public parks. George Wright Forum 19(2):63-66.

Landres, P., J. Alderson, and D.J. Parsons. 2003.
The challenge of doing science in wilderness: historical, legal, and policy context. The George Wright Forum 20(3):42-49.

Landres, P., S. Boutcher, L. Merigliano, C. Barns, D. Davis, T. Hall, S. Henry, B. Hunter, P. Janiga, M. Laker, A. McPherson, D.S. Powell, M. Rowan, and S. Sater. 2005.
Monitoring selected conditions related to wilderness character: a national framework. U.S.D.A. Forest Service Rocky Mountain Research Station General Technical Report, RMRS-GTR-151. Fort Collins, Colorado.

Leopold, A. 1949.
A Sand County Almanac and Sketches Here and There. Oxford University Press. London, England.

National Park Service. 2001.
Management Policies 2001. http://www.nps.gov/policy/mp/cover.htm

Parsons, D.J. 2000.
The challenge of scientific activities in wilderness. In *Wilderness Science in a Time of Change,* Volume 3, compiled by S.F. McCool, D.N. Cole, W.T. Borrie, and J. O'Loughlin. U.S.D.A. Forest Service Rocky Mountain Research Station Proceedings. RMRS-P-15-VOL-3. Fort Collins, Colorado. pp 252-257.

Parsons, D.J., and D.M. Graber. 1991.
Horses, helicopters and hi-tech: managing science in wilderness. In *Preparing to Manage Wilderness in the 21st Century,* compiled by P.C. Reed. U.S.D.A. Forest Service Southeastern Forest and Experiment Station, General Technical Report SE-66. Ashville, NC. pp 90-94.

Peterson, D.L. 1996.
Research in parks and protected areas: forging the link between science and management. In *National Parks and Protected Areas: Their Role in Environmental Protection,* edited by R.G. Wright and J. Lemmons. Blackwell Science. pp 417-434.

Public Law 88-577. 1964.
Wilderness Act (16 USC 1131-1136).

Public Law 96-487. 1980.
Alaska National Interest Lands Conservation Act (16 USC 3101-3233, 94 Stat. 2371).

Scott, D.W. 2002.
"Untrammeled," "wilderness character," and the challenges of wilderness preservation. Wild Earth 11(3/4):72-79.